DOCUMENT RESUME

ED 086 770 UD 014 029

AUTHOR Dawson, Judith
TITLE A Longitudinal and Cross-Sectional Study of the Achievement of Black and Spanish-Surnamed Students in Desegregated Elementary and Secondary Schools.
INSTITUTION Riverside Unified School District, Calif.
PUB DATE Oct 73
NOTE 34p.

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS *Academic Achievement; Bus Transportation; *Cross Sectional Studies; Demography; Elementary School Students; Integration Effects; *Longitudinal Studies; *Negro Students; School Integration; Secondary School Students; *Spanish Speaking; Statistical Surveys; Student Transportation

ABSTRACT

This report is intended as a sort of "status report" on the achievement of bused students in comparison to other students. The major portion of this report is divided into two sections according to the type of data which are analyzed: longitudinal or cross-sectional. First, longitudinal data trace the achievement of a cohort of students from kindergarten during the first year of desegregation through the sixth grade. A second group of students, who started to kindergarten three years after desegregation began, is followed through the third grade. The achievement of these students is compared each year to the achievement of all students in the district in an attempt to determine whether or not there are changes in the difference, or "gap", between the achievement of minority bused students and all district students in general. The data are analyzed by ethnicity, sex, and socioeconomic status. A second part of this report examines the achievement test scores of students in the fifth, sixth, eighth and ninth grades. Because of time limitations, changes in the testing schedule since desegregation began, the missing information, the test scores represent only 1972-1973 rather than the entire period since desegregation began. The data included in this report must be interpreted very cautiously because of high rates of attrition of pupils in the longitudinal samples and missing data for eighth and ninth grade students. (Author/JM)

FILMED FROM BEST AVAILABLE COPY

ED 086770

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

A LONGITUDINAL AND CROSS-SECTIONAL STUDY OF THE ACHIEVEMENT OF BLACK AND SPANISH-SURNAMED STUDENTS IN DESEGREGATED ELEMENTARY AND SECONDARY SCHOOLS

Published by the
RIVERSIDE UNIFIED SCHOOL DISTRICT
3954 12th Street
Riverside, California 92501
(714) 781-2011

BOARD OF EDUCATION

Maxine Frost	President
Ernest M. Lopez	Vice President
Irving H. Balow	Clerk
Margaret K. Rawdon	Member
Richard F. Christensen	Member

Ray Berry, Superintendent

October, 1973

UD 014 029

RIVERSIDE UNIFIED SCHOOL DISTRICT
Riverside, California

DEPARTMENT OF RESEARCH AND EVALUATION
October 1973

A LONGITUDINAL AND CROSS-SECTIONAL STUDY OF THE ACHIEVEMENT OF BLACK AND SPANISH-SURNAMED STUDENTS IN DESEGREGATED ELEMENTARY AND SECONDARY SCHOOLS

Submitted by:

MABEL C. PURL, Ph.D.
Director
Research and Evaluation

Prepared by:

JUDITH DAWSON
Research Analyst

E. RAY BERRY
Superintendent

TABLE OF CONTENTS

	Page
LIST OF TABLES	iii
LIST OF FIGURES	iv
Introduction and Background	1
Desegregation Process and Other Background Information	1
General Description of This Report	2
Longitudinal Data	4
Cohort One	4
Cohort Ten	6
Cohorts One and Ten Compared to Each Other and to Other Cohorts	7
Cross-Sectional Data	8
Some Concluding Remarks	9
APPENDIX	11

LIST OF TABLES

TABLE		Page
1.	Demographic Data for Students in Cohort One	4
2.	Demographic Data for Students in Cohort Ten	6
A.	Tests Which Were Used in This Report	20
B.	Means and Standard Deviations, Standard Scores in Reading Achievement, Cohort One	21
C.	Means and Standard Deviations, Standard Scores in Reading Achievement by Ethnicity, Sex and Socioeconomic Level, Cohort One	22
D.	Means and Standard Deviations, Standard Scores in Reading Achievement, by Level of Predicted Second Grade Achievement, Cohort One	23
E.	Stepwise Multiple Regressions, Predicting Second Grade Reading Achievement Scores, Cohort One	23
F.	Means and Standard Deviations, Standard Scores in Reading Achievement, Cohort Ten	23
G.	Means and Standard Deviations, Standard Scores in Reading Achievement, by Ethnicity, Sex, and Socioeconomic Level, Cohort Ten	24
H.	Means and Standard Deviations, Standard Scores in Reading Achievement, Cohorts One and Ten From This Report and Cohorts Three and Four From 1971 Report	25
I.	Mean Raw Scores on The Metropolitan Readiness Test, Cohorts One and Ten	25
J.	Means, Standard Deviations, Quartiles, and Ranges, Standard Scores in Reading and Aritmetic Achievement, Kindergarten--Grade Nine	26
K.	Means and Standard Deviations, Standard Scores in Reading and Arithmetic Achievement, by Ethnicity, Kindergarten--Grade Nine	27
L.	Means and Standard Deviations, Standard Scores in Reading and Aritmetic Achievement, by Sex, Grade One--Grade Nine	28
M.	Means and Standard Deviations, Standard Scores in Reading Achievement, by Socioeconomic Level, Grade One--Grade Three	28

LIST OF FIGURES

Figure | Page

1. Mean Standard Scores in Reading Achievement, Cohort One 12
2. Mean Standard Scores in Reading Achievement, by Ethnicity, Cohort One 12
3. Mean Standard Scores in Reading Achievement, by Sex, Cohort One 12
4. Mean Standard Scores in Reading Achievement, by Socioeconomic Level, Cohort One 12
5. Mean Standard Scores in Reading Achievement, by Level of Predicted Second Grade Achievement, Cohort One 13
6. Mean Standard Scores in Reading Achievement, Cohort Ten 14
7. Mean Standard Scores in Reading Achievement, by Ethnicity, Cohort Ten 14
8. Mean Standard Scores in Reading Achievement, by Sex, Cohort Ten 14
9. Mean Standard Scores in Reading Achievement, by Socioeconomic Level, Cohort Ten 14
10. Mean Standard Scores in Reading Achievement, Cohorts One, Three, Four, and Ten 15
11. Ranges, Medians, and Quartiles Standard Scores in Reading Achievement, Grades K-9 16
12. Ranges, Medians, and Quartiles, Standard Scores in Arithmetic Achievement, Grades 5-9 17
13. Mean Standard Scores in Reading Achievement, Grades K-9 17
14. Mean Standard Scores in Arithmetic Achievement, Grades 5-9 17
15. Mean Standard Scores in Reading Achievement, by Ethnicity, Grades K-9 17

LIST OF FIGURES

Figure | Page

16. Mean Standard Scores in Arithmetic Achievement, by Ethnicity, Grades 5-9 18

17. Mean Standard Scores in Reading Achievement, by Sex Grades 1-9 18

18. Mean Standard Scores in Arithmetic Achievement, by Sex, Grades 5-9 19

19. Mean Standard Scores in Reading Achievement, by Socioeconomic Level, Grades 1-3 20

Introduction and Background

School desegregation in Riverside began in the fall of 1965 with one-way busing. Since then, we have issued several reports containing analyses of the achievement of minority bused students and other students, primarily Anglo, who attend the schools to which the minority students are bused (these latter pupils have been referred to as "receiving pupils"). Most of these reports have been cross-sectional analyses of the achievement of pupils in primary grades. The analyses have not answered questions regarding the achievment of students who have attended Riverside schools since they started to school; rather, the reports have included the achievement test scores of all students at a particular grade level at the time of testing. Nor have the analyses answered questions regarding the achievement of upper elementary, middle, or high school students. The data have seldom been analyzed by ethnicity or sex and never by socioeconomic status. Mathematics data have not been reported. This report is a partially successful attempt to provide some types of data and analyses that have not been provided in the past.

Many changes have occurred in Riverside schools, and in society in general, since desegregation began. Riverside schools have moved toward decentralization, nongradedness, and individualization-personalization of instruction. Societal changes include general increases in the affluence of the minority and majority populaces and pride in ethnicity. Hopefully, some of these changes have influenced achievement. Therefore, this report is not intended as an analysis of the "effects" of school desegregation on achievement; rather, it is sort of a "status report" on the achievement of bused students in comparison to other students.

Desegregation Process and Other Background Information

A decision to desegregate Riverside's elementary schools was made during the 1965-1966 school year after an incendiary fire at one of three elementary schools which were virtually one hundred percent minority. The school board decided to discontinue using the three schools as regular elementary schools and to use them for other purposes. Their students were assigned to predominantly Anglo schools. Desegregation of elementary schools began when the first group of students was bused in the fall of 1965, continued when the second group of students was bused in the fall of 1966, and was completed when the final group of students was bused in the fall of 1967. However, junior high schools were not quite racially balanced until the fall of 1969, when students were assigned to the junior high school they would have attended if they lived in the neighborhood of their elementary school.

Although most minority students from segregated neighborhoods do ride buses to school, some live close enough to their assigned schools to walk there. Primary grade students are eligible to ride buses if they live more than one mile from school; other students are eligible to ride buses if they live more than two miles from school. This report includes all students from the segregated neighborhoods whether they walk or ride a bus to school. Because middle and high schools receive students from several elementary schools, some students from segregated neighborhoods attend the middle or high school they would have attended without desegregation. These students are also included in this report. This was considered necessary to make the eighth and ninth grade samples comparable to the elementary school samples.

Some confusion might be avoided if Riverside's secondary school organization is explained. It is moving toward a middle school organization; in 1973-1974, elementary schools will include kindergarten through grade six, middle schools will include grades seven and eight, and high schools will include grades nine through twelve. During the period of this study, Riverside had some middle schools and some junior high schools, some three-year high schools and some four-year high schools.

Approximately twenty-five percent of Riverside's students belong to ethnic minority groups; fourteen percent have Spanish surnames, nine percent are black, and two percent belong to other ethnic minority groups.

General Description of This Report

The major portion of this report is divided into two sections according to the type of data which are analyzed: longitudinal or cross-sectional. First, longitudinal data trace the achievement of a cohort of students (Cohort One)* from kindergarten during the first year of desegregation through the sixth grade. A second group of students (Cohort Ten), who started to kindergarten three years after desegregation began, is followed through the third grade. The achievement of these students is compared each year to the achievement of all students in the district in an attempt to determine whether or not there are changes in the difference, or "gap", between the achievement of minority bused students and all district students in general. The data are analyzed by ethnicity, sex, and socioeconomic status.

A second part of this report examines the achievement test scores of students in the fifth, sixth, eighth, and ninth grades. Because of time limitations, changes in the testing schedule since desegregation began, and missing information, the test scores represent only 1972-1973 rather than the entire period since desegregation began. Although they have been the subject of several previous reports, some data for primary grade students are also included because previous reports usually did not contain analyses by ethnicity, sex, and socioeconomic status and because they permit comparisons of primary grade achievement to upper elementary and secondary achievement.

---

*See previous report dated February 1973.

The data included in this report must be interpreted very cautiously because of high rates of attrition of pupils in the longitudinal samples and missing data for eighth and ninth grade students. Attrition and inclusion constraints reduced the first and tenth cohorts to forty-five and fifty-five percent of their original populations, respectively. More than thirty percent of the eighth and ninth grade students who should have been included in this study did not take the achievement tests.

Students were included in the longitudinal analyses only if:

- they took standardized reading achievement tests each of the years that all students in their grade level were tested.

- they were bused for purposes of integration in kindergarten and in 1971-1972 (the assumption is that, if they were bused at those two times, they were also bused during the intervening years; that assumption is probably true for almost all students).

- they progressed one grade level each year (that restriction is an unfortunate one but necessary because different tests are given to students at different grade levels).

The cross-sectional analyses included all students at a grade level who were bused for intergration and who took the achievement tests.

To increase the comparability of test scores for the various years, it was decided to use standard scores. Because district pupils should be more consistent over grade levels than pupils in the various test publishers' norming samples, the district pupils were chosen as comparison groups. The number of students at each grade level was approximately 2,000. Standard scores were computed using district-wide means and standard deviations and converted to scores with a mean of 50 and a standard deviation of 10. The use of the district as a comparison group also permitted ready examination of the data to determine whether or not there were changes over time in the difference between bused pupils and district pupils in general.

It should be noted here that between three and ten percent of the students in the district-wide samples were desegregated minority students. The extent of the effects of changes in the achievement of minority students on district-wide data is not known. It is assumed that the effects would be slight; if and where they existed, the effects probably diluted standard score changes.

The standard score data included in this report reflect achievement changes or differences which occurred only in comparison to district-wide data. They do not reflect absolute changes or differences. For example, a recent report showed that the achievement of kindergarten and first grade bused students has improved significantly and is now at approximately the same level as the students in the test publishers' norming samples. Kindergarten standard scores suggest that the achievement of bused pupils has not increased more that district-wide achievement; the standard scores of kindergarten bused students are only slightly higher than third grade bused students. The first grade standard scores of bused students,

however, are higher than the kindergarten and third grade scores, suggesting that the achievement of first grade bused pupils has improved more than the achievement of district first grade students in general.

The achievement tests which were used each year are shown in Table A of the appendix.

Longitudinal Data

Cohort One

As mentioned earlier, students in the first cohort were in kindergarten the first year of desegregation (1965-1966). Approximately two-thirds of those students were bused to desegregated schools that first year. The remaining one-third attended a segregated school during kindergarten; approximately one-half of them were bused at the beginning of the first grade and the remaining half at the beginning of the second grade. This study follows the achievement of this cohort of students through the sixth grade in 1971-1972. Attrition and the restrictions specified above left only forty-five percent of the orginal kindergarten students in this cohort sample. A demographic description of the students in the first cohort is shown in Table 1, below.

TABLE 1

Demographic Data for Students in Cohort One

Ethnicity, Sex, and Socioeconomic Level*	Number	Percent
Total	63	
Spanish-surnamed	43	68
Black	20	32
Male	25	40
Female	38	60
High SEL	2	3
Middle SEL	18	29
Low SEL	33	52
SEL not available	10	16

*Socioeconomic level, as used throughout this report, is based on the occupation of the head of the household in which the student resides. The categorization system of the U.S. Bureau of the Census is used. High socioeconomic level includes professional, technical, and managerial occupations; middle includes clerical and sales workers, craftsmen, foremen, and operatives; and low includes service workers and laborers.

Data for Entire Group

The mean test score of the students in Cohort One each year is shown graphically in Figure 1. Means and standard deviations are shown in Table B of the appendix. It is readily apparent that little change occurred in average achievement from kindergarten through the sixth grade. The largest difference, between the first and third grades, was less than one-fourth of a standard deviation, hardly significant. This lack of change does not mean that students did not progress, but that their progress was very similar to, and did not exceed, the average progress of district students in general.

Data by Ethnicity, Sex, and Socioeconomic Level

Data by ethnicity, sex, and socioeconomic level are shown in Figures 2, 3, and 4 and in Table C of the appendix. Differences between the various groups were slight and seldom significant but were consistent. Blacks scored slightly higher than students with Spanish surnames and females scored slightly higher than males. Students from the middle socioeconomic level scored slightly higher than students from the low socioecomonic level. As there were only two students classified as having high socioeconomic level, their scores are not shown.

Data by Achievement Level

Data by achievement level are shown in Figure 5 and in Table D of the appendix. "Achievement level", as used here, refers to level of predicted second grade score. The scores were predicted from kindergarten and first grade scores using stepwise multiple regression analyses. Predicted second grade scores were used rather than actual kindergarten or first grade scores to avoid the regression toward the mean effect. An attempt was made to increase the power of prediction by also including socioeconomic data, but they did not enter the equation at significant level so were not used. Data from the multiple regression analysis are shown in Table E of the appendix.

The predicted second grade scores were combined into three groups: high, middle, and low. The high group included the highest twenty-five percent of the predicted scores, the middle group included the middle fifty percent, and the low group included the lowest twenty-five percent.

The data shown in Figure 5 and Table D are the actual second through sixth grade scores of students in each of the three groups. The data show some fluctuations, particularly at the fourth grade level, but relatively slight changes over time. The high group dropped very slightly while the middle and low groups dropped approximately one-fourth of a standard deviation. Unless the sixth grade changes become trends, the data do not show differential changes for students at differing achievement levels. (It should be noted that the high group is high in comparison to other bused students only; it is average in comparison to all district students.

Perhaps the picture would have been slightly different if there had been enough high-achieving bused students to have formed a group that was high in comparison to the district.)

Cohort Ten

This group of students started to kindergarten at the beginning of the fourth year of desegregation; none of them ever attended segregated schools. Their achievement is followed through the third grade in 1971-1972. The sample restrictions specified previously eliminated all but fifty-five percent of the bused students who started to kindergarten in 1968-1969. The data for students in Cohort Ten will be presented by ethnicity, sex, and socioeconomic status; however, they will not be presented by level of predicted second grade score because the actual scores for only the second and third grades would have been available. A demographic description of the students in Cohort Ten is shown in Table 2, below.

TABLE 2

Demographic Data for Students in Cohort Ten

Ethnicity, Sex, and Socioeconomic Level	Number	Percent
Total	110	
Spanish-surnamed	62	56
Black	48	44
Male	58	53
Female	52	47
High SEL	5	4
Middle SEL	35	32
Low SEL	36	33
SEL not available	34	31

Data for the Entire Group

Data for all students in Cohort Ten are shown in Figure 6 and in Table F in the appendix. The data show that the average score went up more than one-fourth of a standard deviation in the first and second grade but dropped to its kindergarten level in the third grade. This same trend was evident, but to a lesser degree, in the data for Cohort One. These data, with the data that were presented in Figure 4 and data that will be presented in Figure 9, at first appear to be a test artifact. However, the test which was given to third graders was also given to first and second graders. Perhaps, when students are first learning to read, differences among them become temporarily less.

Data by Ethnicity, Sex, and Socioeconomic Level

Figures 7, 8, and 9 and Table G in the appendix show data for students in Cohort Ten by ethnicity, sex, and socioeconomic level. The slight differences by ethnicity and sex which were evident in kindergarten reversed themselves in the first grade and continued that way, becoming more pronounced in the second grade. Again, Black students generally scored higher than Spanish-surnamed students and females scored higher than males. Socioeconomic differences, except between the middle and low groups in the first and second grades, were approximately one-half of a standard deviation but were not statistically significant. Students in the high socioeconomic group scored approximately at the average of district-wide students.

Cohorts One and Ten Compared to Each Other and to Other Cohorts

Data for the two cohorts included in this report and for two other cohorts which were included in a 1971 report are shown in Figure 10 and in Table H in the appendix. The data show that, while students in the various cohorts scored at about the same level in comparison to district students in general, the scores of students in Cohorts Three and Four were slightly lower at the end of the 1971 study than were students in Cohort One in 1971-1972.

The 1971 report included data for students in Cohorts One, Three, and Four. At that time, it appeared that students in Cohorts Three and Four, most of whom were desegregated after the second grade, were victims of the increasing deficit phenomenon, so prevalent among low-achieving students. As they progress through school, the difference between their achievement and that of other students continually grows wider. All of the students in Cohort One, however, were desegregated in or before the second grade. At the time of the 1971 report, data were available for them through the fourth grade. At that time, the gap between them and other students had not grown. It was hypothesized that, due to early desegregation and related factors, these students would not experience the increasing deficit. The sixth grade data for Cohort One which were shown in Figures 1 and 10 indicate that the early finding is still true, although the average score did drop very slightly in the sixth grade. An attempt was made to also do a follow-up study of the students in Cohort Four but the attrition was so great that the study could not be completed. When this study began, students in Cohort Three had not been tested for more than a year.

Figure 10 shows that students in Cohort One scored slightly higher in comparison to the district than did students in Cohort Ten. Raw score data (Table I, Appendix), however, show that the average raw score of students in Cohort Ten was higher than the average raw score of students in Cohort One. This indicates that, while the achievement of bused students has increased, it hasn't increased as much as has the district as a whole. Raw score data are not comparable at other grade levels because different tests were given to Cohort Ten than to Cohort One.

Cross-Sectional Data

The achievement of upper elementary and secondary students is the subject of this section. The data are cross-sectional, and for the 1972-1973 school year only. Some data for primary grade pupils are also presented, to provide comparisons for the older students and to present additional ayalyses, by ethnicity, sex, and socioeconomic status, which were not included in previous reports. The primary grade data are from spring 1972. As mentioned earlier, these data were presented in a previous report, in which they were compared with data for other students who were in the primary grades in prior years.

Data for Entire Grade-Level Groups

Ranges, medians, and quartiles in reading and arithmetic are shown in Figures 11 and 12 and in Table J in appendix. The data show that the third quartile of the minority students was at or slightly below the mean of district students as a whole and that the third quartile point remained rather stable across the grades and across the two subject areas. The median and first quartile tended to increase in the first and second grades and decline after that. The interquartile range was also more narrow in the first and second grades than in other grades. Arithmetic achievement was slightly higher than reading achievement.

Average reading and arithmetic achievement scores are shown in Figures 13 and 14 and in Table J in the appendix. The mean of the bused students was again higher at the first and second grades than at other grades, approximately one-half of one standard deviation below the district-wide mean. At other grade levels, the mean of the bused students was approximately three-fourths of a standard deviation below the district-wide mean.

Data by Ethnicity, Sex, and Socioeconomic Level

Figures 15 and 16 and Table K of the appendix show data by ethnicity. As was true of the longitudinal data, Black students generally scored higher than Spanish-surnamed students. The differences were not significant, but they were consistent. In arithmetic, however, Spanish-surnamed students scored higher than blacks in the fifth and sixth grades and only very slightly lower in the eighth and ninth grades. These data suggest that language barriers slightly, but consistently, impede the achievement of Spanish-surnamed students.

Data by sex are shown in Figures 17 and 18 and in Table L of the appendix. Again, girls generally scored slightly, but not significantly, higher than boys.

Socioeconomic data are shown in Figure 19 and in Table M of the appendix. Unfortunately, the socioeconomic and achievement data of upper elementary and secondary students were not on the same data processing records and a lack of time prevented the creation of a new record containing both kinds of data. The first, second, and third grade data show that differences were slight in the first

grade but became more pronounced in the second and third grades. It would be interesting to know whether or not theses differences continue to become even more pronounced at upper elementary and secondary levels than at the third grade level.

Some Concluding Remarks

This report has been an analysis of the achievement of ethnic minority students who live in segregated neighborhoods but attend desegregated schools, primarily through busing. Standardized reading achievement test scores of the minority students have been compared to the scores of the district as a whole using standard scores. Some mathematics achievement data have also been presented. Longitudinal data have been analyzed for two cohorts of desegregated students; one of these cohorts was followed through the sixth grade and the other through the third grade. Cross-sectional data have been analyzed for desegregated students in grades kindergarten through nine. Most of the data have been analyzed by ethnicity and sex; in addition, some of the data have been analyzed by socio-economic and achievement levels.

Some of the conclusions which may be drawn from the data presented in this report are similar to the conclusions of previous reports; others are different, primarily because of new types of analyses.

Some of the findings are:

Changes in the achievement of bused pupils have been relatively slight in comparison to district-wide achievement. This does not mean that the achievement of bused pupils has not changed; previous reports have shown rather dramatic increases in the achievement of kindergarten and first grade bused pupils. The lack of change in standard scores indicates that changes in the achievement of bused pupils have been similar to changes in the achievement of district pupils in general. As has been noted in previous reports, it seems likely that instructional programs have had similar effects on all students. (The reader should be reminded here that 5 to 10 percent of the students in the district-wide data which were used to calculate the standard scores were minority students who were bused for desegregation. The effect of this on the data is not known. Changes in the achievement of bused students might have had a slight impact on district-wide data. This might have diluted somewhat changes in the standard scores of minority desegregated students.)

- Longitudinal data seem to indicate, as did the data in a previous report, that students who are desegregated at an early grade level do not experience an increasing deficit. This finding should continue to be tested with other groups of students. To decrease the sample loss by attrition, it is suggested that future studies examine achievement at several points in time only, rather than at each grade tested.

- In comparison to district-wide achievement, bused pupils score higher at the first and second grade levels than at other grade levels. Their achievement increases in the first grade, remains there in the second grade, and decreases in the third grade. For the cross-sectional samples, these changes were statis-

tically significant. They might not be significant for the longitudinal samples, although the data to apply the appropriate satistical test were not available. Bused pupils achieve approximately one-half of a standard deviation below district pupils in the first and second grades and approximately three-fourths of a standard deviation below the district at other grade levels. Although this at first appears to be an achievement test artifact, the same test is given at the third grade as at first and second grades.

•Black students tend to score slightly higher in reading than do Spanish-surnamed students; the differences are not significant, but they are consistent. In mathematics, however, this pattern does not exist. Unfortunately, this study included mathematics data for students in the fifth, sixth, eighth, and ninth grades only and in 1972-1973 only. Future analyses should include mathematics achievement test results for more students.

•Girls score slightly higher than boys; again, the differences are usually not significant but consistent.

•Desegregated minority students whose socioeconomic levels are classified as high (i.e., their fathers' occupations are professional, technical or managerial) generally achieve at a level similar to district as a whole, students of middle socioeconomic status achieve approximately one-half of a standard deviation less, and students of low socioeconomic status achieve even less. These differences are less at the first grade level than at other grade levels and appear to become wider as the students progress through school, although this thesis needs to be subjected to further analysis.

•With some fluctuation, the average achievement of students in grades two through six is approximately the same as their "expected" achievement, as predicated from their kindergarten and first grade achievement. There are, of course, many individual deviations from this pattern; this also needs further study.

APPENDIX

Cohort #1 Mean Standard Scores

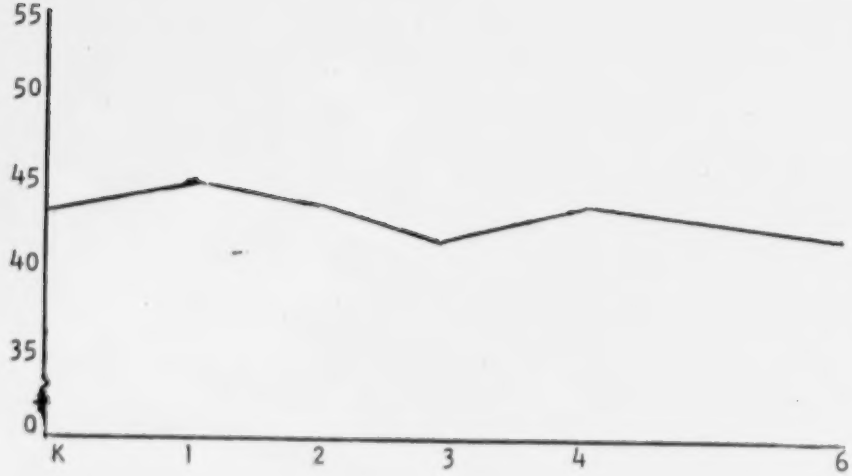

Fig. 1.--Mean standard scores in reading achievement, Cohort One.

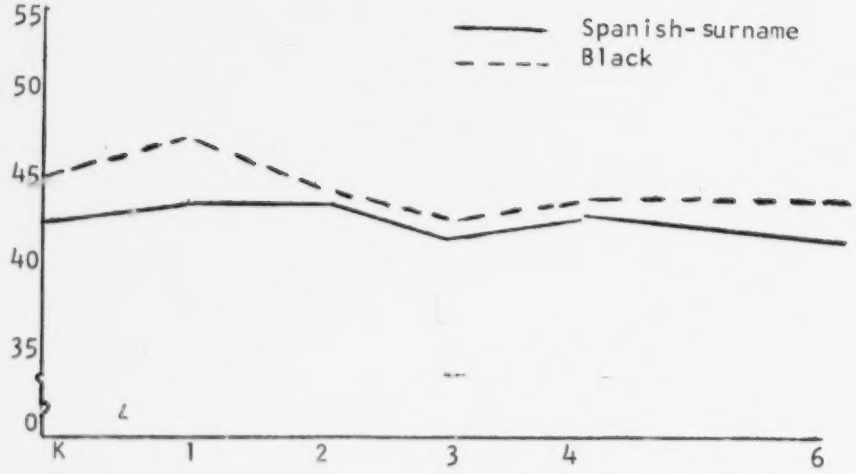

Fig. 2.--Mean standard scores in reading achievement, by ethnicity, Cohort One.

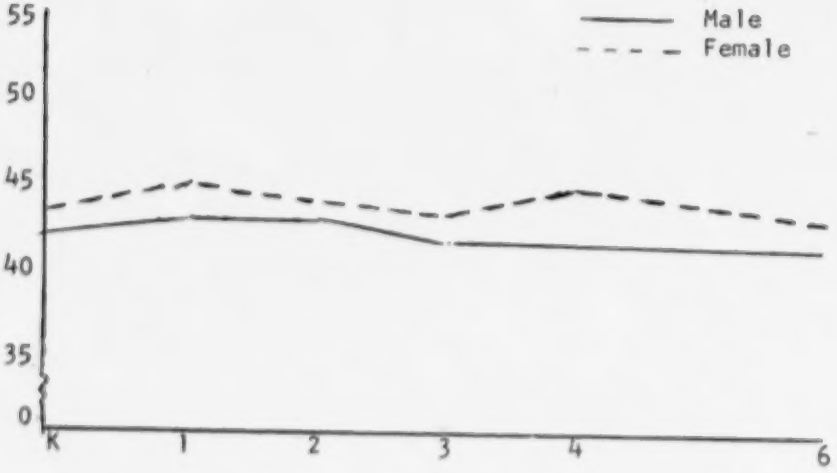

Fig. 3.--Mean standard scores in reading achievement, by sex, Cohort One.

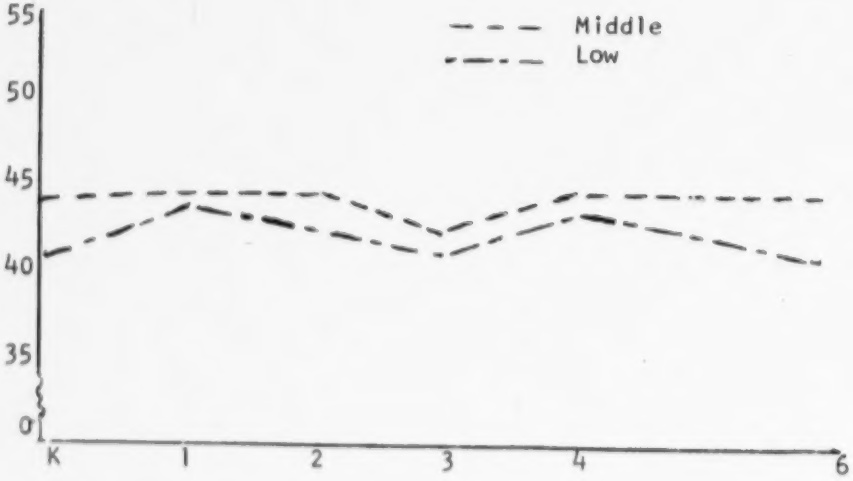

Fig. 4.--Mean standard scores in reading achievement, by socioeconomic level, Cohort One.

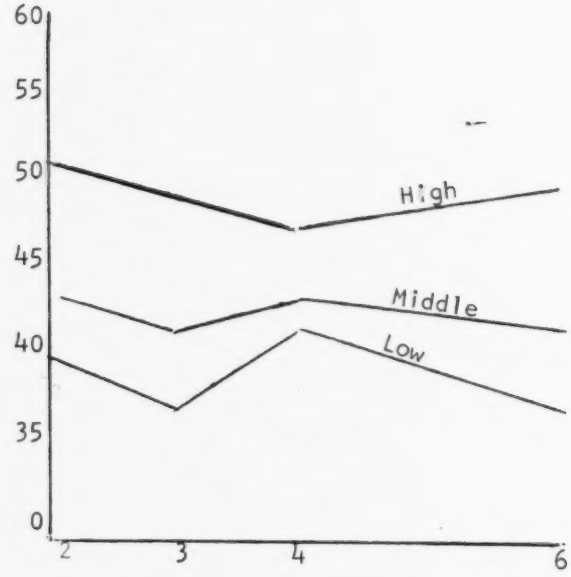

Fig. 5.--Mean standard scores in reading achievement, by level of predicted second grade achievement, Cohort One.

Cohort #10 Mean Standard Scores

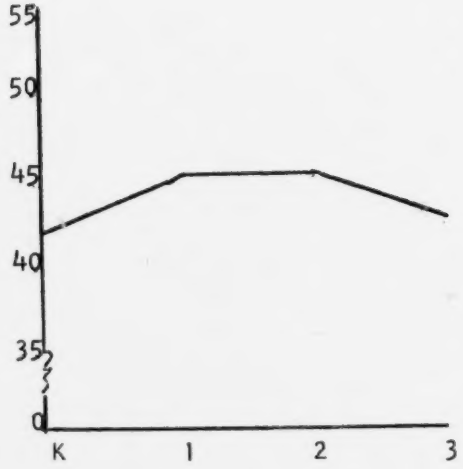

Fig. 6.-- Mean standard scores in reading achievement, Cohort Ten.

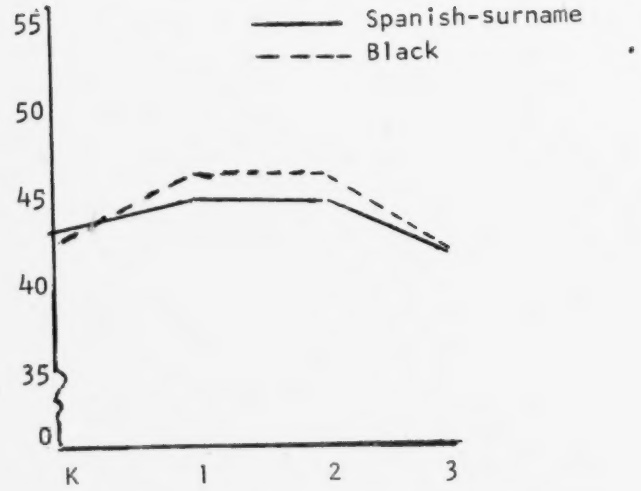

Fig. 7.--Mean standard scores in reading achievement, by ethnicity, Cohort Ten.

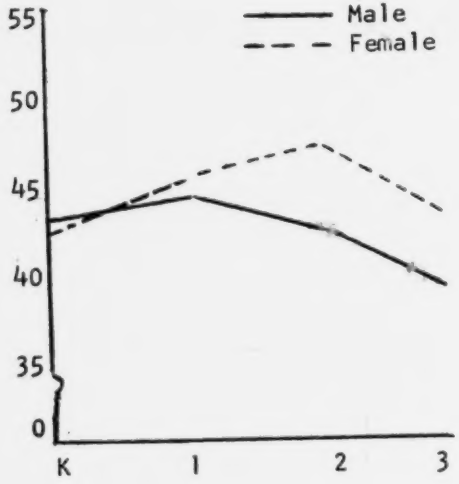

Fig. 8.--Mean standard scores in reading achievement, by sex, Cohort Ten.

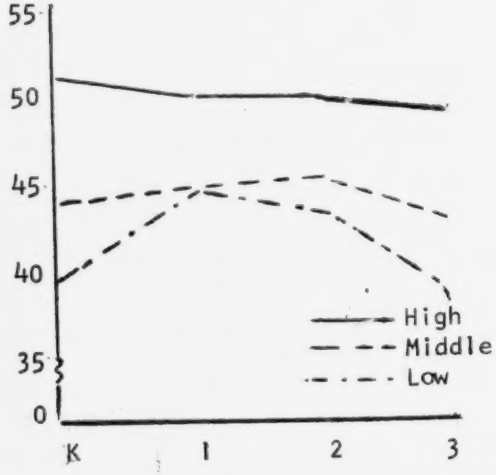

Fig. 9.--Mean standard scores in reading achievement, by socioeconomic level, Cohort Ten.

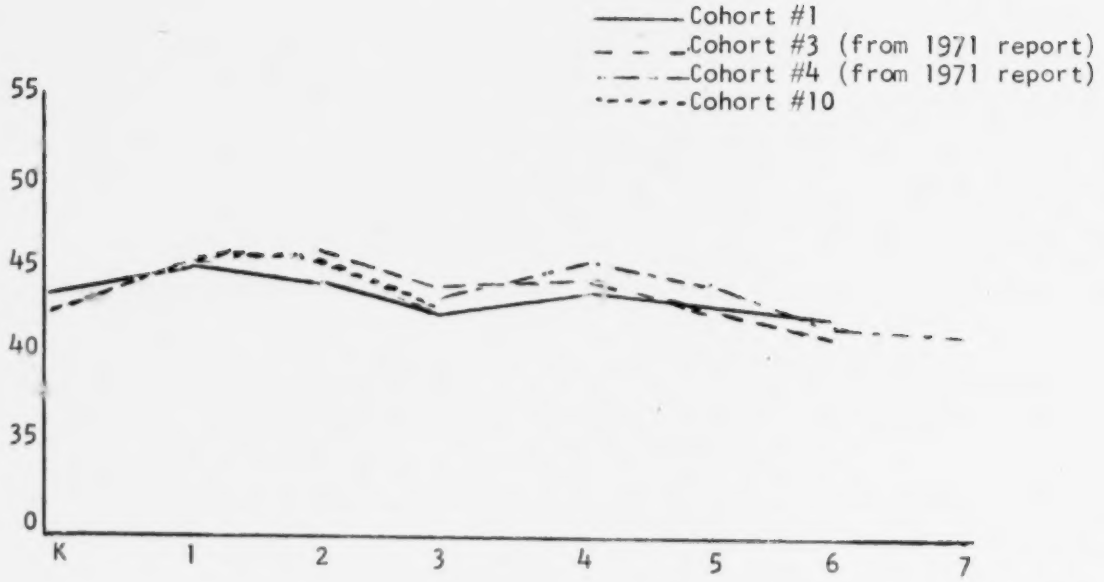

Fig. 10.--Mean standard scores in reading achievement, Cohorts One, Three, Four, and Ten.

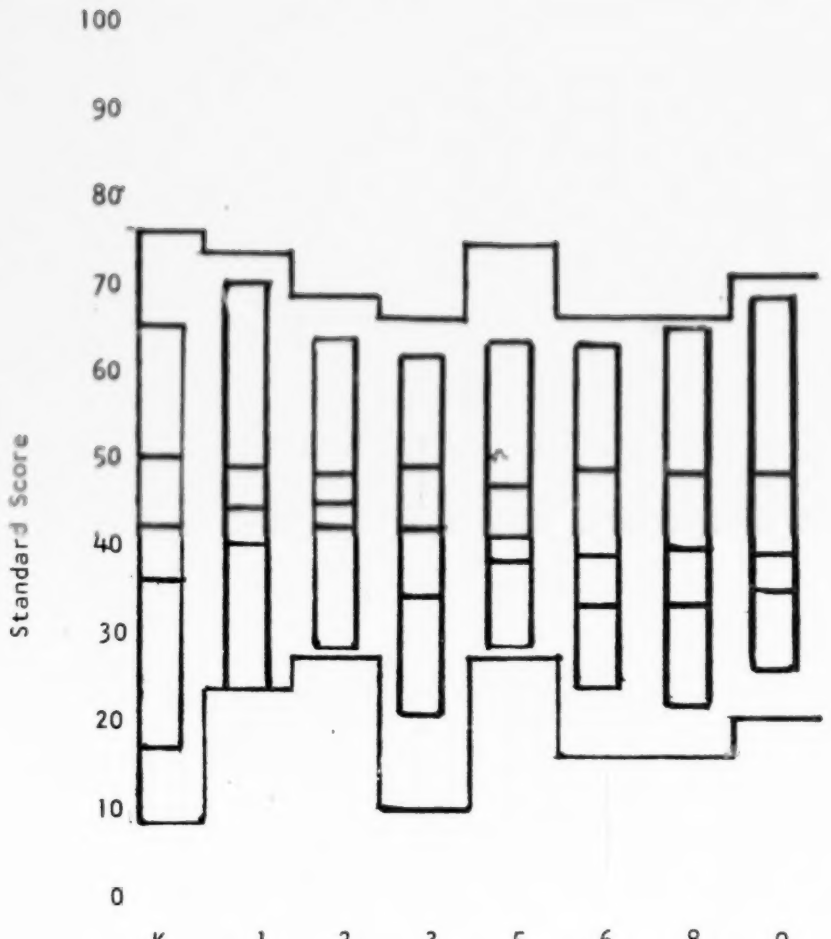

Fig. 11.--Ranges, medians, and quartiles standard scores in reading achievement, grades K-9.

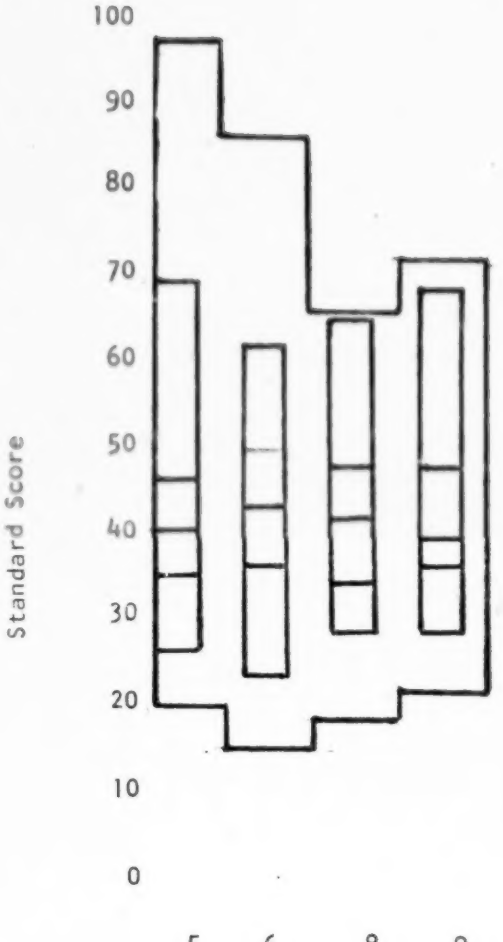

Fig. 12.--Ranges, medians, and quartiles, standard scores in arithmetic achievement, grades 5-9.

Note:
The continuous lines above and below the bars show the maximum and minimum attainable scores.

Bused Students 1972
Mean Standard Scores

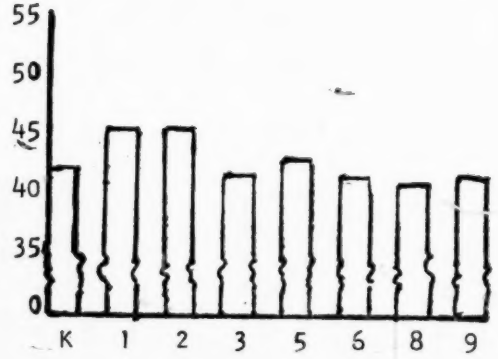

Fig. 13.--Mean standard scores in reading achievement, grades K-9.

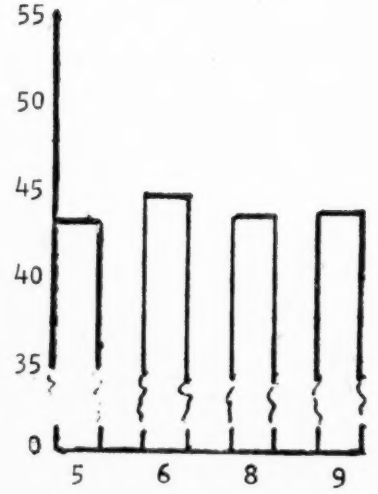

Fig. 14.--Mean standard scores in arithmethic achievement, grades 5-9.

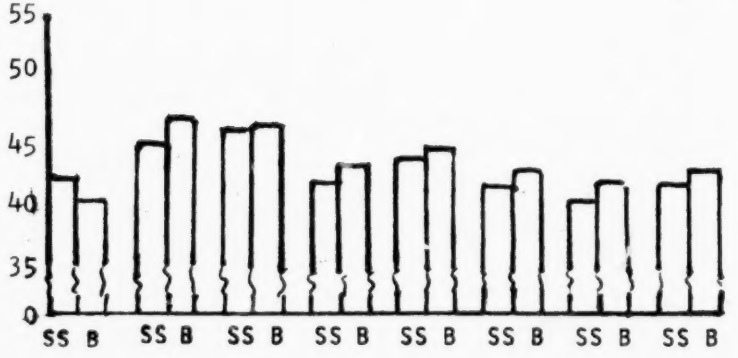

Fig. 15.--Mean standard scores in reading achievement, by ethnicity, grades K-9.

Bused Students 1972
Mean Standard Scores

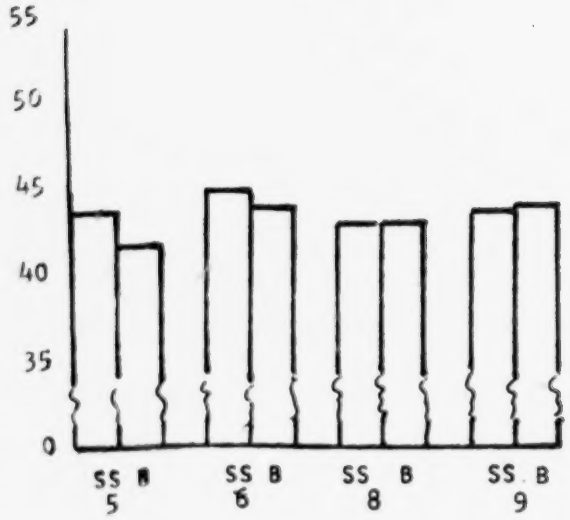

Fig. 16.--Mean standard scores in arithmetic achievement, by ethnicity, grades 5-9

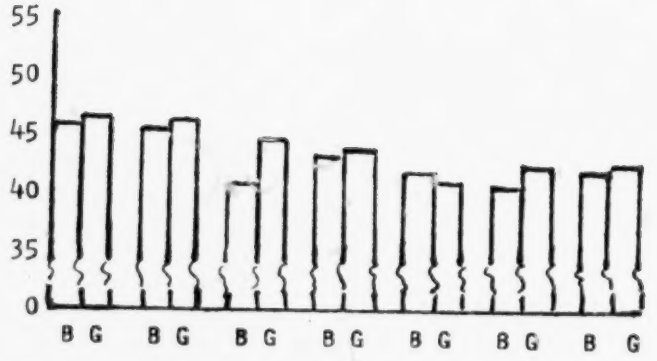

Fig. 17.--Mean standard scores in reading achievement, by sex grades 1-9.

Bused Students 1972
Mean Standard Scores

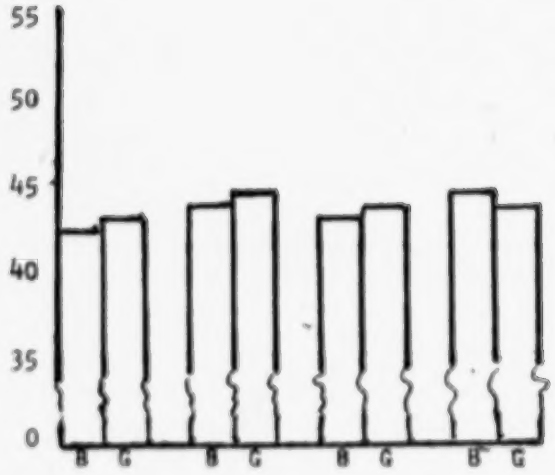

Fig. 18.--Mean standard scores in arithmetic achievement, by sex, grades 5-9.

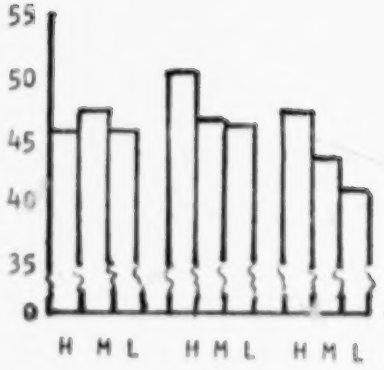

Fig. 19.--Mean standard scores in reading achievement, by socioeconomic level, grades 1-3.

TABLE A

TESTS WHICH WERE USED IN THIS REPORT

Students	Test and Score
Longitudinal Samples	
Cohort One	
Kindergarten	Metropolitan Readiness Test, total score
First Grade	Stanford Achievement Test, total reading score
Second Grade	Standord Achievement Test, total reading score
Third Grade	Stanford Achievement Test, total reading score
Fourth Grade	Comprehensive Tests of Basic Skills, reading total score
Sixth Grade	Comprehensive Tests of Basic Skills, reading total score
Cohort Ten	
Kindergarten	Metropolitan Readiness Test, total score
First Grade	Cooperative Primary Test, reading score
Second Grade	Cooperative Primary Test, reading score
Third Grade	Cooperative Primary Test, reading score
Cross-Sectional Samples	
Kindergarten	Metropolitan Readiness Test, total score
First Grade	Cooperative Primary Test, reading score
Second Grade	Cooperative Primary Test reading score
Third Grade	Cooperative Primary Test, reading score
Fifth Grade	Comprehensive Tests of Basic Skills, reading total and arithmetic total scores
Sixth Grade	Comprehensive Tests of Basic Skills, reading total and arithmetic total scores
Eighth Grade	Comprehensive Tests of Basic Skills, reading total and arithmetic total scores
Ninth Grade	Comprehensive Tests of Basic ski'ls, reading total and arithmetic total scores

TABLE B

MEANS AND STANDARD DEVIATIONS, STANDARD SCORES IN READING ACHIEVEMENT, COHORT ONE

Grade	No. of Students	Mean	Standard Deviation
Kdg.	63	43.22	7.95
1st	63	44.66	8.45
2nd	63	43.99	6.24
3rd	63	42.41	8.51
4th	63	43.78	6.23
6th	63	42.75	9.15

TABLE C

MEANS AND STANDARD DEVIATIONS, STANDARD SCORES IN READING ACHIEVEMENT BY ETHNICITY, SEX AND SOCIOECONOMIC LEVEL, COHORT ONE

Grade	No. of Students	Mean	S.D.	No. of Students	Mean	S.D.	No. of Students	Mean	S.D.
Ethnicity									
	Spanish-surname			Black					
Kdg.	43	42.79	7.70	20	44.15	8.60			
1st	43	43.36	6.60	20	47.46	11.16			
2nd	43	43.76	5.69	20	44.47	7.44			
3rd	43	42.11	7.41	20	43.05	10.69			
4th	43	43.61	5.35	20	44.15	7.94			
6th	43	42.08	8.38	20	44.18	10.71			
Sex									
	Male			Female					
Kdg.	25	42.45	6.63	38	43.73	8.76			
1st	25	43.11	6.20	38	45.68	9.59			
2nd	25	42.97	5.29	38	44.65	6.78			
3rd	25	41.56	7.82	38	42.96	8.99			
4th	25	41.69	4.41	38	45.16	6.89			
6th	25	41.77	9.25	38	43.39	9.15			
Socioeconomic Level									
	High*			Middle			Low		
Kdg.	2	. .	. .	18	43.86	7.34	33	41.36	7.56
1st	2	. .	. .	18	44.33	6.21	33	44.39	8.84
2nd	2	. .	. .	18	44.36	5.84	33	43.13	5.66
3rd	2	. .	. .	18	42.90	8.80	33	41.52	7.58
4th	2	. .	. .	18	44.44	5.62	33	43.23	5.23
6th	2	. .	. .	18	44.18	10.37	33	41.39	7.78

*As there were only two students classified as high socioeconomically means and standard deviations for them are not shown.

TABLE D

MEANS AND STANDARD DEVIATIONS, STANDARD SCORES IN READING ACHIEVEMENT, BY LEVEL OF PREDICTED SECOND GRADE ACHIEVEMENT, COHORT ONE

Grade	No. of Students	Mean	S.D.	No. of Students	Mean	S.D.	No. of Students	Mean	S.D.
	High			Middle			Low		
2nd	16	50.49	6.49	31	42.89	4.57	16	39.61	3.01
3rd	16	49.31	5.97	31	41.56	7.28	16	37.14	8.70
4th	16	48.38	7.13	31	42.77	5.37	16	41.14	4.43
6th	16	49.74	7.10	31	41.54	7.88	16	38.09	9.64

TABLE E

STEPWISE MULTIPLE REGRESSIONS, PREDICTING SECOND GRADE READING ACHIEVEMENT SCORES, COHORT ONE

Variable	Entering First	Multiple Correlation (R)	Multiple Determination (R^2)	Change in R^2 Value	Zero-Order Correlation (r)	Beta
1st Grade Score	28.81	.601	.361	.361	.601	.438
Kdg. Score	8.14	.671	.450	.089	.550	.341

TABLE F

MEANS AND STANDARD DEVIATIONS, STANDARD SCORES IN READING ACHIEVEMENT, COHORT TEN

Grade	No. of Students	Mean	Standard Deviation
Kdg.	110	41.98	10.14
1st	110	45.25	7.27
2nd	110	45.30	16.12
3rd	110	42.11	9.52

TABLE G

MEANS AND STANDARD DEVIATIONS, STANDARD SCORES IN READING ACHIEVEMENT, BY ETHNICITY, SEX, AND SOCIOECONOMIC LEVEL, COHORT TEN

Grade	No. of Students	Mean	S.D.	No. of Students	Mean	S.D.	No. of Students	Mean	S.D.
Ethnicity									
	Spanish-surname			Black					
Kdg.	62	42.37	10.47	48	41.47	9.79			
1st	62	44.65	7.10	48	46.02	7.49			
2nd	62	44.55	13.38	48	46.27	19.19			
3rd	62	42.01	9.28	48	42.25	9.92			
Sex									
	Male			Female					
Kdg.	58	42.09	9.68	52	41.85	10.73			
1st	58	44.64	7.49	52	45.92	7.03			
2nd	58	43.47	13.69	52	47.35	18.37			
3rd	58	40.38	10.21	52	44.04	8.37			
Socioeconomic Level									
	High			Middle			Low		
Kdg.	5	50.88	7.98	35	44.32	10.39	36	39.74	10.23
1st	5	49.80	8.17	35	45.00	7.17	36	44.67	7.38
2nd	5	50.22	5.29	35	45.84	16.07	36	43.52	16.88
3rd	5	49.11	7.75	35	43.33	8.99	36	39.41	10.10

TABLE H

MEANS AND STANDARD DEVIATIONS, STANDARD SCORES IN READING ACHIEVEMENT, COHORTS ONE AND TEN FROM THIS REPORT AND COHORTS THREE AND FOUR FROM 1971 REPORT

Cohort and Grade	No. of Students	Mean	Standard Deviation
One			
Kindgergarten	63	43.22	7.95
First Grade	63	44.66	8.45
Second Grade	63	43.99	6.24
Third Grade	63	42.41	8.51
Fourth Grade	63	43.78	6.23
Sixth Grade	63	42.75	9.15
Three			
Second Grade	56	45.89	6.28
Third Grade	56	43.86	NA
Fourth Grade	56	44.57	NA
Fifth Grade	56	42.89	NA
Sixth Grade	56	41.64	9.69
Four			
Third Grade	49	43.37	7.23
Fourth Grade	49	45.61	NA
Fifth Grade	49	44.22	NA
Sixth Grade	49	42.06	NA
Seventh Grade	49	41.29	8.37
Ten			
Kindergarten	110	41.98	10.14
First Grade	110	45.25	7.27
Second Grade	110	45.30	16.12
Third Grade	110	42.11	9.52

TABLE I

MEAN RAW SCORES ON THE METROPOLITAN READINESS TEST, COHORTS ONE AND TEN

	Number of Students	Mean Raw Score
Cohort One	63	42.48
Cohort Ten	110	46.16

TABLE J

MEANS, STANDARD DEVIATIONS, QUARTILES, AND RANGES, STANDARD SCORES IN READING AND ARITHMETIC ACHIEVEMENT, KINDERGARTEN--GRADE NINE

Test and Grade	No. of Students	Mean	S.D.	Q_1	Median	Q_3	Range	Possible Range
Reading								
Kindergarten	157	43.06	10.10	36	42	50	17-65	8-76
First Grade	176	45.52	7.57	40	44	49	23-70	23-73
Second Grade	175	45.58	5.84	42	45	48	28-63	27-68
Third Grade	185	42.13	9.33	34	42	49	21-62	10-66
Fifth Grade	187	42.97	6.83	38	41	47	28-63	27-74
Sixth Grade	176	41.40	10.20	33	39	49	23-63	16-66
Eighth Grade	158	41.07	9.84	33	40	48	22-65	16-66
Ninth Grade	131	42.07	8.97	35	39	48	26-68	21-71
Arithmetic								
Fifth Grade	188	42.66	7.99	36	41	47	27-69	21-97
Sixth Grade	174	43.86	8.63	37	43	50	24-62	16-86
Eighth Grade	162	43.17	9.02	35	42	48	29-65	19-66
Ninth	130	43.54	8.41	37	40	48	29-68	22-72

Note:

Data for students in kindergarten through grade three are from tests administered in spring 1972; data for students in grades five through nine are from tests administered during the 1972-1973 school year.

TABLE K

MEANS AND STANDARD DEVIATIONS, STANDARD SCORES IN READING AND ARITHMETIC ACHIEVEMENT, BY ETHNICITY, KINDERGARTEN--GRADE NINE

Grade	No. of Students	Mean	S.D.	No. of Students	Mean	S.D.
	Spanish-surnamed			Black		
Reading						
Kindergarten	84	43.64	9.93	64	42.33	10.39
First Grade	90	44.67	6.95	75	46.12	7.89
Second Grade	92	45.33	5.18	78	45.62	6.37
Third Grade	78	41.80	8.94	92	42.62	9.76
Fifth Grade	112	42.75	6.57	65	43.56	6.86
Sixth Grade	81	40.92	10.19	83	42.02	10.21
Eithth Grade	59	39.31	9.23	87	41.08	9.29
Ninth Grade	57	41.15	7.80	60	42.08	9.44
Arithmetic						
Fifth Grade	114	43.51	8.08	64	41.35	7.65
Sixth Grade	80	44.49	8.59	82	43.52	8.84
Eighth Grade	60	42.61	8.29	90	42.67	9.15
Ninth Grade	57	43.49	8.11	60	43.58	8.85

Note:

The number of students included in this table is less than the total number of students in Table J. Students who were classified as Anglo or as ethnic minority other than Black or Spanish-surnamed were not included in this table. A few Anglo students do live in the segregated minority neighborhoods; the names and the ethnicity of the siblings of most of the Anglo students, however, led us to suspect that the ethnic code in their records was incorrect.

TABLE L

MEANS AND STANDARD DEVIATIONS, STANDARD SCORES IN READING AND ARITHMETIC ACHIEVEMENT, BY SEX, GRADE ONE--GRADE NINE

Grade	No. of Students	Mean	S.D.	No. of Students	Mean	S.D.
	Male			Female		
Reading						
First Grade	96	45.14	7.78	80	45.98	7.34
Second Grade	84	45.05	6.18	91	46.07	5.50
Third Grade	99	40.54	9.76	86	43.95	8.50
Fifth Grade	78	42.74	7.67	109	43.13	6.19
Sixth Grade	85	41.70	11.23	90	40.98	9.13
Eighth Grade	89	40.26	10.67	69	42.12	8.61
Ninth Grade	56	41.83	9.29	75	42.24	8.79
Arithmetic						
Fifth Grade	79	42.43	8.23	109	42.82	7.83
Sixth Grade	85	43.68	9.44	88	44.00	7.87
Eighth Grade	86	42.72	9.77	76	43.67	8.12
Ninth Grade	53	43.90	9.06	77	43.29	7.99

TABLE M

MEANS AND STANDARD DEVIATIONS, STANDARD SCORES IN READING ACHIEVEMENT, BY SOCIOECONOMIC LEVEL, GRADE ONE--GRADE THREE

Grade	No. of Students	Mean	S.D.	No. of Students	Mean	S.D.	No. of Students	Mean	S.D.
	High			Middle			Low		
1st	11	45.36	11.03	52	47.21	7.86	51	45.27	6.87
2nd	12	50.14	6.95	51	45.69	5.25	49	45.22	6.78
3rd	9	47.28	10.28	56	42.84	8.99	64	40.24	9.11

Note:

The number of students included in this table is less than the total number of students in Table J. Socioeconomic information was not available for all students.